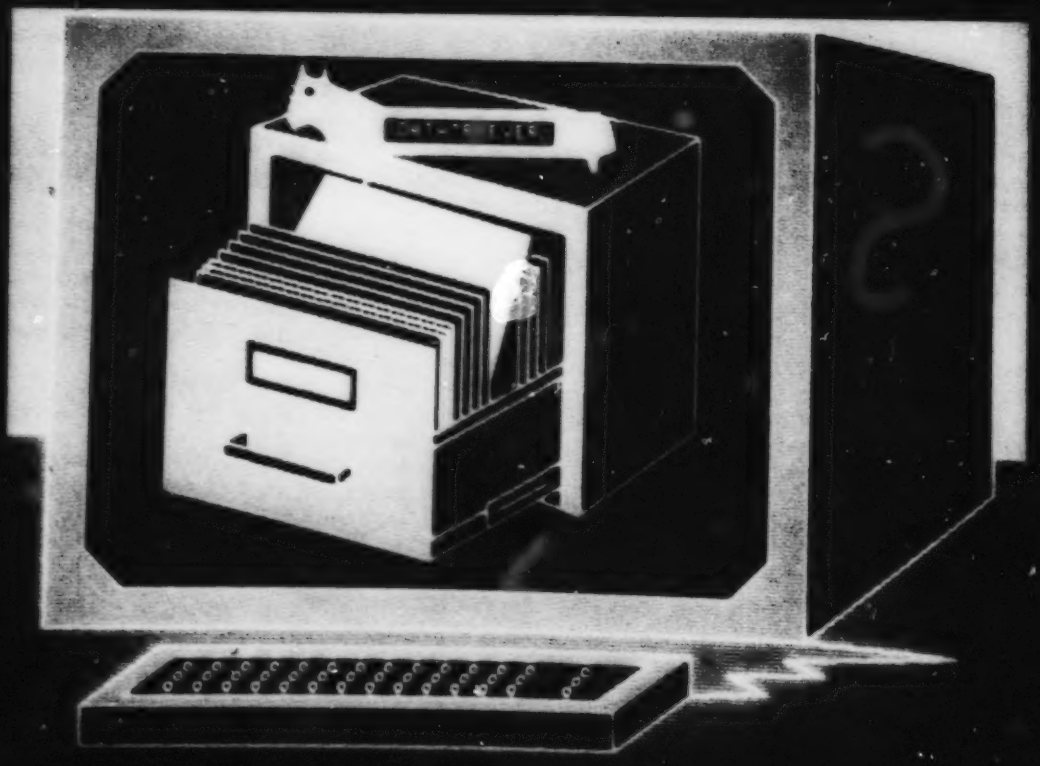
Environment Canada
Canadian Forestry Service

Environnement Canada
Service canadien des forêts

A Personal Library Reference Retrieval System

P. Kourtz

Information Report PI-X-31
Petawawa National Forestry Institute



86-02048/

PETAWAWA NATIONAL FORESTRY INSTITUTE

The Petawawa National Forestry Institute (PNFI) was formed on April 1, 1979, as the result of an amalgamation of the Petawawa Forest Experiment Station with the Ottawa-based Forest Management and Forest Fire Research Institutes. The Forestry Statistics and Systems Branch was established at PNFI in 1980.

In common with the rest of the Canadian Forestry Service, the Petawawa National Forestry Institute has as its objective the promotion of better management and wiser use of Canada's forest resource to the economic and social benefit of all Canadians. Because it is a national institute, particular emphasis is placed on problems that transcend regional boundaries or that require special expertise and expensive equipment that cannot be duplicated in CFS regional establishments. Such research is often performed in close cooperation with staff of the regional centres or provincial forest services.

Research at the Institute is in two main areas:

FIRE RESEARCH AND REMOTE SENSING. Every year in Canada large areas of productive forest are destroyed by fire. Research concentrates on studies of forest fire behaviour, the development of new methods of fire control, the evaluation of fire-fighting equipment and retardants, and the development of computerized fire management systems that are rapidly finding applications with fire-fighting agencies across the country. The environmental and economic impact of forest fires and the use of fire as a silvicultural tool for intensive forest management are also studied.

In remote sensing, investigations are made into the application of modern satellite and airborne remote sensing systems to forestry problems. In this respect, the ARIES digital image analysis system is proving invaluable.

INTENSIVE FOREST MANAGEMENT. As Canada moves into more intensive management of its forest to meet expected increases in demand for this vital resource, the role of this program will become increasingly important. An extensive reforestation program will require a steady supply of high-quality seed of the desired species. Improved growing stock, obtained through tree breeding and forest genetics research, is highly desirable. Increased emphasis is being placed on using the entire above-ground portion of the tree (biomass), but the effect on the environment of this and other forms of intensive management has to be carefully monitored. Biotechnological methods of improving yield while maintaining site productivity are being investigated.

In support of its research programs, the Institute has at its disposal a 98 km^2 area of forest in the western part of the Petawawa military reserve. Records of experiments and sample plots have been maintained since the 1920s. The forest also serves as a field laboratory for students from local schools, and a visitor centre is operated during the summer months.

The operations of PNFI also include THE FORESTRY STATISTICS AND SYSTEMS BRANCH (FSSB) which is responsible for the acquisition and publication of national information on the forests of Canada. Through the Canadian Forest Inventory Committee, which is comprised of provincial and federal forestry officials, the FSSB works in close cooperation with provincial forest agencies to improve and standardize the information available on Canada's forest resources.

Through the FORSTATS program, which involves all regional establishments of the Canadian Forestry Service, the FSSB coordinates the acquisition and publication within the CFS of national statistics on the forest of Canada.

Every five years, the FSSB publishes Canada's Forest Inventory; the official report on the location, extent, species, and condition of the forest resource. In addition, the FSSB is working closely with the provinces to expand the information available on changes to the forest from fire, harvesting, insects and disease, and from forest management activities. This information is essential to the development of sound policies for the improved management of this important and renewable natural resource.

A PERSONAL LIBRARY REFERENCE RETRIEVAL SYSTEM

Information Report PI-X-31

P. Kourtz

Petawawa National Forestry Institute
Canadian Forestry Service
Environment Canada
1983

© Minister of Supply and Services Canada 1983
Catalogue No. Fo46-11/31-1984E
ISSN 0706-1854
ISBN 0-662-12993-8

Additional copies of this publication can
be obtained from:

Technical Information and Distribution Centre
Petawawa National Forestry Institute
Canadian Forestry Service
Environment Canada
Chalk River, Ont.
K0J 1J0

Tel.: 613 589-2880

Cette publication est aussi disponible en français sous le titre Un système de recherche de réferénces d'une bibliothèque personnelle.

Contents

i	Abstract/Résumé
1	Improving access to library materials
2	Data stored for each reference
2	Reference retrieval
3	Other operations to assist in locating references
4	Reference input
5	Reference removal
5	Changing a reference
5	Summary of additional features
6	Reference

Abstract

A computer system suitable for storing and accessing reference materials in personal reprint collections at the Petawawa National Forestry Institute is described. The system is designed so that the existence of these materials can be made known to all researchers through the use of an Institute-wide computer terminal network. Also, the system offers the potential for sharing these library materials with other researchers at the various Canadian Forestry Service regional centres using a common computer network.

Stored for each reference are: authors, identification number, date, key words, location, publisher, and abstract. A user can quickly retrieve references using simple English commands that provide a large variety of search options. New references can be easily entered into the system. Individual collections are maintained as separate libraries in the computer. Common formats, terminology, and access methods insure that these materials can be shared. Tests indicate that over 20 000 references in an individual library can be stored and efficiently searched.

The library system makes use of Digital Equipment Corporation's Datatrieve data management software and consequently can be used only on the PDP-11 and VAX computers. These computers and software are used by most Canadian Forestry Service research facilities.

Résumé

Voici une description d'un système informatique mis en place à l'Institut national forestier de Petawawa pour le stockage et la consultation de la documentation dans les collections personnelles de réimpressions. Le système est conçu de telle sorte que l'existence de la documentation puisse être communquée à tous les documentalistes grâce à un réseau de terminaux installés à l'Institut. En outre, le système pourrait permettre d'échanger de la documentation avec les documentalistes des divers centres régionaux du Service canadien des forêts si un réseau informatique commun est mis sur pied.

Chaque notice porte le nom de l'auteur (des auteurs), le numéro d'identification, la date, des mots-clés, le lieu d'édition, le nom de l'éditeur et un résumé. Un usager peut extraire rapidement des renseignements à l'aide de commandes simples, rédigée en langue anglaise, et qui fournissent de nombreuses options de recherche. De nouvelles notices peuvent être versées facilement dans le système. Les collections individuelles sont stockées sous forme de bibliothèques séparées dans l'ordinateur. Des présentation, une terminologie et des méthodes d'accès communes garantissent le partage de la documentation. Les tests indiquent que plus de 20 000 notices d'une bibliothèque individuelle peuvent être stockées et consultées efficacement.

Le système est exploité grâce à un logiciel de gestion des données Datatrieve de la Digital Equipment Corporation; par conséquent, seuls les ordinateurs PDP-11 et VAX peuvent être employés. Ces ordinateurs et ce logiciel sont utilisés par la majorité des centres de recherche du Service canadien des forêts.

P. Kourtz is a research scientist at the Petawawa National Forestry Institute.

Manuscript approved for publication: December 1983.

A PERSONAL LIBRARY REFERENCE RETRIEVAL SYSTEM

Improving access to library materials

The Canadian Forestry Service operates six regional research laboratories and two national forest research institutes. At each of these facilities there are numerous personal reprint collections maintained by individual scientists and their technical support staff. The Petawawa National Forestry Institute (PNFI), for instance, has at least a dozen personal reprint collections. One such collection exceeds 5000 references. Management and access to these various personal literature collections generally are restricted to their owners. This is because they use unique indexing and access methods intended to meet only the owner's needs.

A computer-based retrieval system for library references has been developed to handle the personal and project scientific libraries at PNFI. The system is designed to store and retrieve an estimated 20 000 references.

The library system described in this report is installed on a Digital Equipment Corporation's PDP-11/44 computer and requires the support of a large disk storage area of about 100 megabytes. Access to the library system is available from any PNFI computer terminal regardless of the computer to which it is attached.

The system permits each owner of a library to continue to update and maintain his or her library as a separate unit. However, common formats, terminology, and access methods permit complete sharing of information with other researchers. Part of each reference's description contains its physical location. When a scientific paper or textbook is removed from a library the new location or name of the borrower can be attached to the reference. Thus owners can use the system to keep track of borrowed references.

The library system is designed for rapid access to references where some information such as an author or key word exists. Simple, 'user friendly' search procedures are available for inexperienced users. The more sophisticated user can take advantage of more elaborate but more efficient search procedures.

Searching, reference entry, or modification can be carried out by authorized users. The security is at two levels. First the user must have access to a computer through the normal identification number and password. Second, the user must also have the correct library system password. Access to the system can be prevented, restricted to only searching, or unrestricted to enable new entries of references or modifications of existing references. At the highest security level permission is granted to modify the formats of the entire library system.

Data stored for each reference
The following items or fields are stored for each reference:

- Title (80 characters maximum) <abbreviation is T>
- Subject (20 characters maximum) <S>
- Identification number (5 characters maximum used for rapid access to a known reference <ID>
- Authors' last names (up to three authors using 80 characters for the first author and 30 characters for each of the other two) < A is the abbreviation for all three authors' last names, A1, A2, A3 are the abbreviations for the first, second, and third author's last names >
- Authors' first names or initials (30 characters) < A1F, A2F, A3F >
- Key words (up to 10 key words using up to 20 characters each <K is the abbreviation for all 10 key words, K1, K2,... is the abbreviation for the first, second,...,last key word>
- Year (4 digits) < Y >
- Publication (30 characters maximum) < P >
- Location (80 characters maximum intended for the current location or name of the borrower and date) < L >
- Abstract (765 characters maximum) < ABS is the abbreviation for the entire abstract; ABS1, ABS2, and ABS3 are abbreviations for the three abstract subsets > .

Each user defines his or her own subjects, identification number, key words, and location. The identification number is included for the convenience of the user and can consist of any alphanumeric 5-character string. Any field of the reference can be omitted.

Reference retrieval
The user must first sign on the library system computer using standard computer log-on commands and then activate the Datatrive data management program by typing the following underlined items and then the RETURN key:

> DTR

DTR > READY FIRELIB "Firelib" is a collection of forest fire reprints. Each library has its own name and must be made ready by the user before it can be accessed.

Searches can now be made on all fields. They can be for specific words such as an author's last name or for character strings such as the partial spelling of an author's last name. Searches are completed in seconds when exact spelling of the author's last name or key word is given. Character strings in any field such as in the title or in an abstract can be located but it could take several minutes depending on the size of the library.

Three special procedures have been created to assist a user in locating references:

1) DTR > :AUTHOR This procedure requests that the user type the exact spelling of an author's last name. It immediately locates and automatically prints or displays at the user's terminal the number of references located and a complete description of each reference by this author.

2) DTR> :KEY This procedure requests that the user type exact spelling of a key word of interest. It immediately searches all references for this key word (up to 10 per reference). References containing this key word are automatically printed or displayed on the user's terminal.

3) DTR> :STRING This procedure is designed to find all reference containing a specific string of characters or numbers regardless of where in the reference they may be located. For example, the string could be a partial word or group of words in a title or abstract (maximum of 30 characters or numbers). Because searching for strings is relatively inefficient, the user is expected to localize the search as much as possible. This is done using the FIND command and is described later. Once the user has reduced the number of references to be examined using FIND, the STRING command will identify all references containing the string and print or display the references on the terminal.

Other operations to assist in locating references

The FIND and PRINT command are used by more advanced users to create specific subsets of references that cannot be created using the AUTHOR, KEY, and STRING commands and the computer stores these references in a temporary file called CURRENT. At no time is the original reference set altered. The FIND command requires the user to search fields of interest using a group of special terms called logic operators to define the search limits. These logic operators include: EQ (equal), NE (not equal), GT (greater than), LT (less than), LE (less or equal), BT (between), AND, OR, NOT, CONTAINING, and NOT CONTAINING. They can be used in the FIND command separately or in combinations. The general structure of the FIND command is: FIND (library name or CURRENT) WITH (field name or abbvreviation) Logic Operator (search range). A user can use FIND to narrow down the set of references of interest. For example, suppose one wishes to locate all articles written in 1978 by D.L. Martell.

DTR > FIND FIRELIB WITH Y EQ 1978 This places in the temporary file CURRENT all 1978 references recorded in the FIRELIB library.

DTR > FIND CURRENT WITH A1 EQ "MARTELL" This selects from the CURRENT file of 1978 references, those references by first-author Martell. These references will be placed in a new CURRENT file and the previous file erased. The same results could be obtained directly with:

DTR > FIND FIRELIB WITH Y EQ 1978 AND A1 EQ "MARTELL"

Additional examples of possible computer commands follow:

DTR> FIND FIRELIB WITH Y BETWEEN 1970 AND 1980 This places in CURRENT all references with a year between 1970 and 1980.

DTR> FIND FIRELIB WITH Y EQ 1978 AND KEY EQ "INFRARED" This places in CURRENT all 1978 references with 'infrared' used as a key word.

DTR> FIND CURRENT WITH YEAR GT 1962 AND L EQ "PNFI LIBRARY" This places in CURRENT references with a year greater than 1962 that are located in the

'PNFI library'. It is an example of using FIND and CURRENT to converge on the reference set of interest using a sequence of FIND CURRENT WITH ... commands.

DTR > FIND FIRELIB WITH Y LT 1981 AND K1 EQ "FIRE DETECTION" This places in CURRENT references written before 1981 that have as a first key word 'fire detection'.

DTR > FIND CURRENT WITH T CONTAINING "AIRCRAF" This places in a new version of CURRENT all references in the old CURRENT file that have the character string 'aircraf' in their title.

DTR > FIND CURRENT WITH Y EQ 1958, 1964, 1948 This overwrites the old version of CURRENT with all references from the previous version of CURRENT written in 1958 or 1964 or 1948.

To see the references in CURRENT the user can use either:

DTR > PRINT CURRENT This prints or displays the contents of the current file in a somewhat unorganized fashion on the user's terminal, or

DTR > :REF-REPORT This activates a special program that presents the reference information in a more organized manner. None of the print options alter the contents of CURRENT.

It is possible to print only the information of specific fields in each reference. For example:

DTR > PRINT T (-), A1 (-), Y (-) OF CURRENT This will print the title, last name of the first author and year of each reference in CURRENT. The contents of CURRENT will not be changed. The (-) suppresses the automatic titling mode.

The PRINT command can be used in a manner similar to the FIND command using WITH plus a logic operation. For example:

DTR > PRINT T (-) OF CURRENT WITH K1 EQ "INFRARED" AND A NOT CONTAINING "HIRSCH" This prints the titles of references that have a first key word of 'infrared' and any author whose last name does not contain the character string 'HIRSCH'. The previous contents of CURRENT will remain unaltered.

DTR > PRINT COUNT This will print the number of references in CURRENT.

Reference input

A new reference can be entered into the library by any authorized user. First the library must be readied for reference input by typing:

DTR > READY FIRELIB WRITE then typing:

DTR > STORE FIRELIB At this point the computer prompts the user for every field entry. If more characters are typed than permitted, an error message is produced and the field must be retyped. If the user does not wish to enter information in a specific field he or she types a space and the RETURN key and the next field will be prompted.

DTR > REPEAT 6 STORE FIRELIB This will automatically prompt the user for entry of 6 references.

Reference removal

To erase a reference an authorized user must first locate it precisely. The safest way to do this is to use the FIND command to place it in a CURRENT file and then use the ERASE command. This command erases records not only from the CURRENT file but also from the original data file. For example:

DTR > ERASE ALL OF CURRENT WITH Y EQ 1965 AND A1 EQ "MARTELL" or any other WITH clause that can uniquely identify the reference. Another way is to localize the reference so that it is the only reference in CURRENT. To be sure it is the correct reference one could print the title first (PRINT T OF CURRENT). The ERASE ALL command will erase the references in the CURRENT file. If more than one reference is in CURRENT, the SELECT n command can be used to localize the nth reference so that it can be erased.

DTR > SELECT 2 THEN ERASE will erase the second reference in the CURRENT file. Note that any two commands can be chained together using THEN. This causes the commands to be executed one after the other automatically.

Changing a reference

To change the information in a specific field such as the title, the user must first place the reference in a CURRENT file. Then the field of the SELECTed reference can be changed using the MODIFY command. Changes made to references in the CURRENT file are automatically made to the original reference data file.

DTR > MODIFY T will erase the old title and the complete revised title must be entered by the user. The MODIFY command can be used to identify those references that have been borrowed, and by whom. For example the LOCATION field that normally indicates where in the library the reference is located can be changed to include the word 'borrowed', the borrower's name, and date that it was loaned. The owner of the library can check the status of all borrowed books by:

DTR > PRINT T(-),A(-),L(-) OF FIRELIB WITH L CONTAINING "BORROW" This will print the titles, authors, and locations including borrowers' names and dates of all references borrowed from the library.

Summary of additional features

The Datatrieve management system offers a host of additional opportunities such as:

- the easy setting up of new libraries with unique library names and definitions chosen by the owner
- merging the contents of two or more existing libraries into a single larger library
- creating a new library from portions of existing libraries
- creating procedures that combine Datatrieve commands aimed at achieving specific objectives such as the listing of references in alphabetic order, the identification of overdue loans, etc.

- detailed examination of the state of library data, structures, and procedures
- sorting of references according to specific field values or subject areas.

The specific format used in the library system and the procedures can be obtained from the Petawawa National Forestry Institute, Chalk River, Ontario, Canada, K0J 1J0.

REFERENCE

Digital Equipment Corp. 1980. Datatrieve-11 V2.0 User's Guide. Order No. AA-C742B-TC. Digital Equipment Corp., Maynard, Mass.